

# Comparison of Single-Text and Current TCR Options

Doug Owen and Vanessa Speight  
TWG Representatives

TCRDS Federal Advisory Committee Meeting  
June 18, 2008

# This Meeting's Presentations

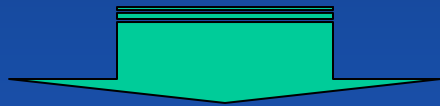
Objectives



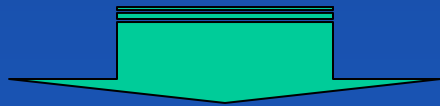
Provisions



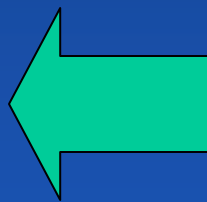
System compliance



Improvement



Research

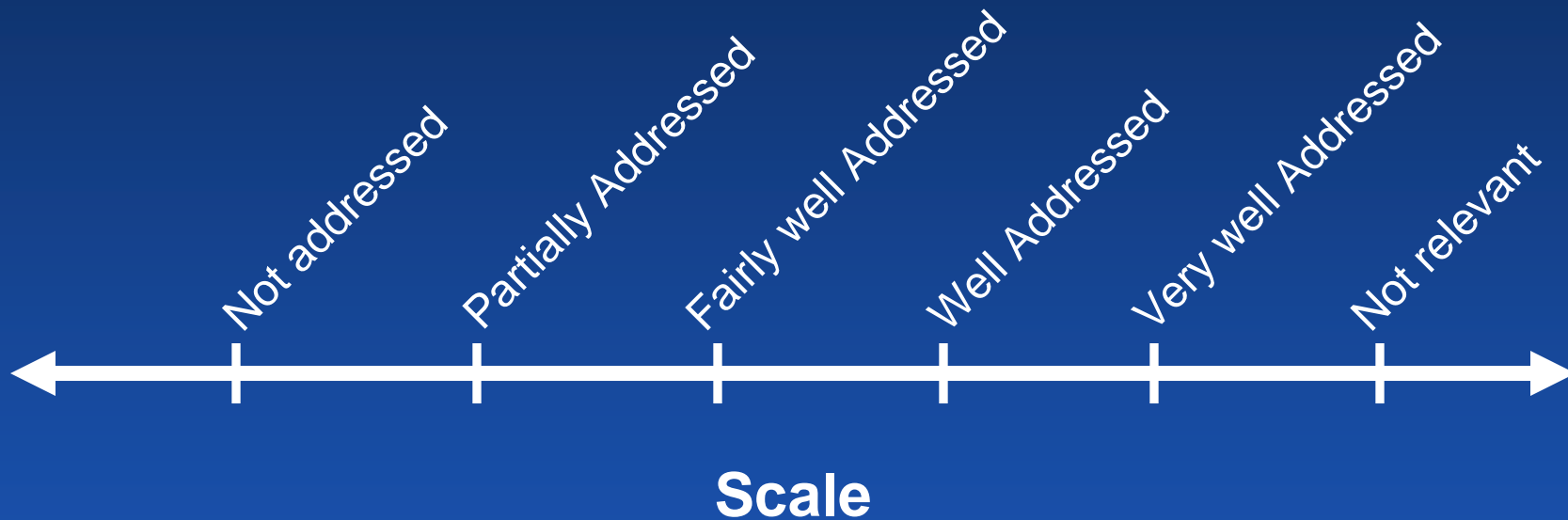


Comparison of Single -  
Text and Current TCR

# Presentation Objectives

- Qualitatively assess the extent to which the single-text and current TCR meet the TCR objectives, in combination with other rules.
- Qualitatively compare the single-text and current TCR rule under improvement criteria outlined by the FAC in October 2007, for example:
  - Be at least as protective of public health
  - Reduce burden
  - Simpler to implement...
- Quantitatively compare for single-text and current TCR as implemented:
  - number of systems triggered for follow-up action
  - costs (national and household)

# Objectives Assessment Scale (1)

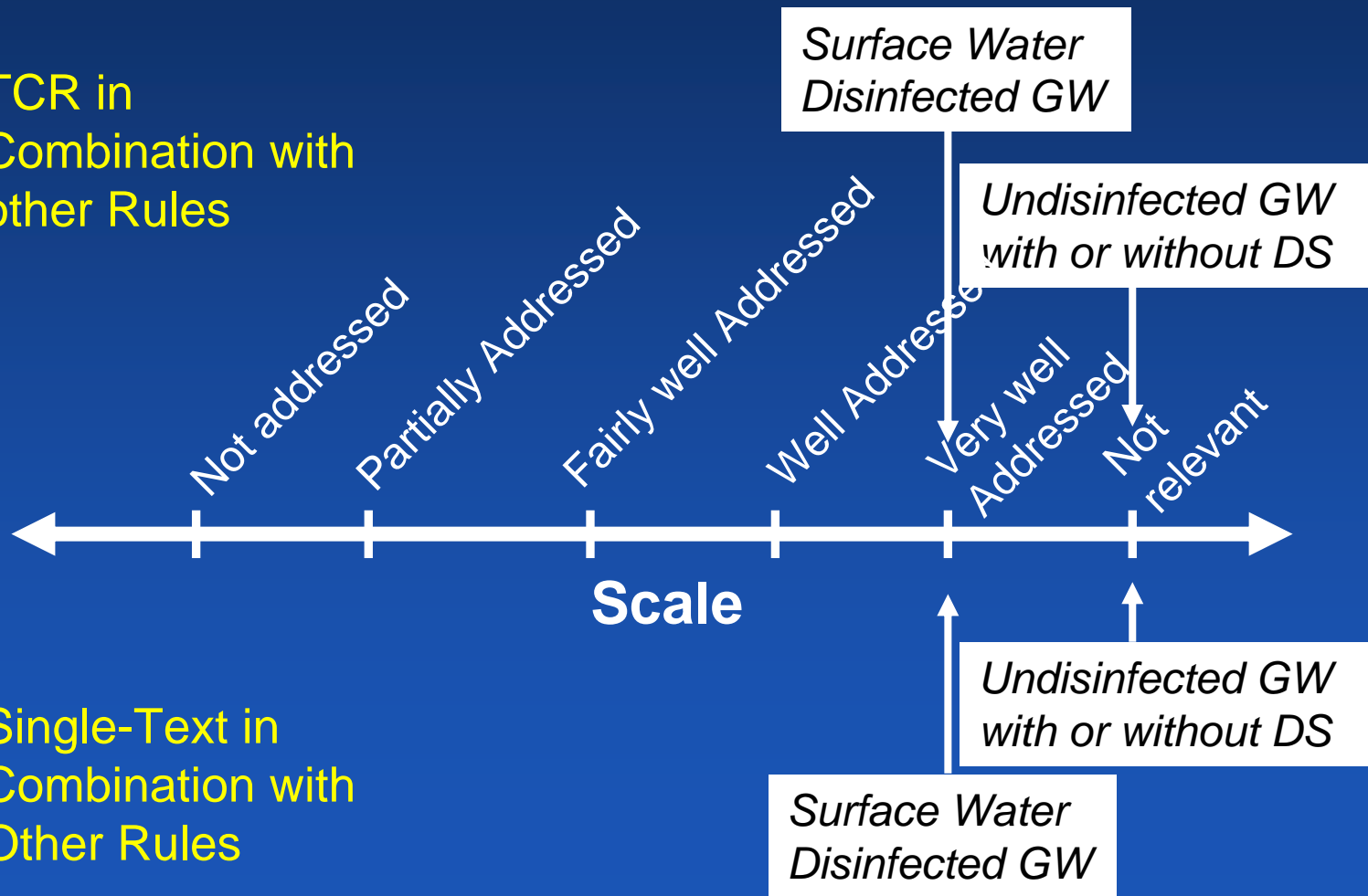


Note:

1. From December 2007 FAC meeting

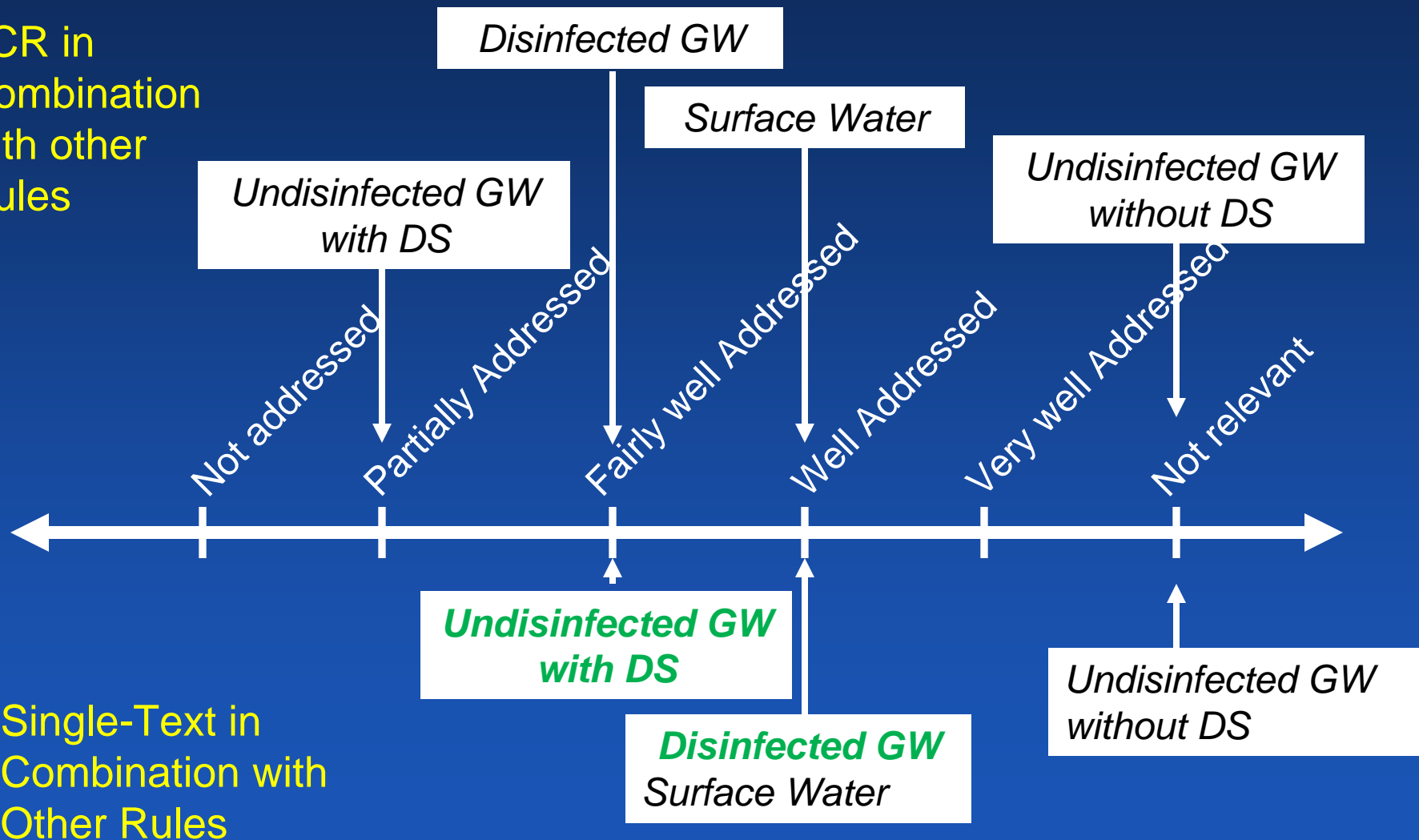
# Impact of Single-Text on Objectives: Evaluate Treatment Effectiveness

TCR in  
Combination with  
other Rules



# Impact of Single-Text on Objectives: Determine Distribution System Integrity

TCR in  
Combination  
with other  
Rules



Single-Text in  
Combination with  
Other Rules

# Impact of Single-Text on Objectives: Signal Possible Fecal Contamination

TCR in  
Combination  
with Other  
Rules

*Disinfected GW  
Undisinfected GW  
with and without DS*

*Surface Water*

Not addressed  
Partially Addressed  
Fairly well Addressed  
Well Addressed  
Very well Addressed  
Not relevant

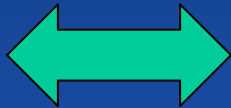
Single-Text in  
Combination with  
Other Rules

*Disinfected GW  
Undisinfected GW  
with and without DS  
Surface Water*

# Criteria Comparison Definition



- Single text is more effective than the current TCR




- Single text and current TCR address criterion relatively equally




- Single text is not as effective as current TCR




# Comparison with FAC Criteria

Criterion	Single-Text Impact	Comments
Protective of public health		<ol style="list-style-type: none"><li>1. A similar number of systems are identified for follow-up action through the monitoring schemes.</li><li>2. Assessment and possible corrective action are features of the single-text, as opposed to only additional monitoring and public notification in the current TCR.</li></ol>

# Comparison with FAC Criteria

Criterion	Single-Text Impact	Comments
Reduce burden		<ol style="list-style-type: none"><li>1. National cost is similar.</li><li>2. Household costs are similar for routine monitoring; lower for additional routine and repeat monitoring in single-text.</li><li>3. Depending upon action taken, total household costs may increase for smaller systems in single-text.</li><li>4. State burden will increase to implement criteria for reduced monitoring and for level 2 assessments, particularly in smaller systems.</li><li>5. Burden is shifting towards monitoring to identify issues, assessment and correction.</li></ol>


# Comparison with FAC Criteria

Criterion	Single-Text Impact	Comments
Cost-effective (1)		1. Single-text provides benefits through assessment and possible corrective action.


Note:

1. Defined as the opportunity to improve public health for the dollar spent

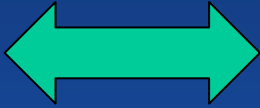
# Comparison with FAC Criteria

Criterion	Single-Text Impact	Comments
Simpler to implement		1. FAC will continue to evaluate based upon presentations provided in this meeting.


# Comparison with FAC Criteria

Criterion	Single-Text Impact	Comments
Considers implication and linkages to other rules.		1. The monitoring linkage between the current TCR and the GWR, SWTRs, and D/DBP Rule has been discussed and considered.


# Comparison with FAC Criteria

Criterion	Single-Text Impact	Comments
Reflects variations in system type and size.		1. Both versions have provisions that vary according to system type and size.

# Comparison with FAC Criteria


Criterion	Single-Text Impact	Comments
Recognizes the value of effective operators		<ol style="list-style-type: none"><li>1. Level 1 assessment is performed by the system, encouraging system accountability in evaluating potential causes for TC+.</li><li>2. Systems with certified operators have the opportunity to perform Level 2 assessment.</li><li>3. Certified operators are a component of the reduced monitoring criteria.</li></ol>

# Comparison with FAC Criteria

Criterion	Single-Text Impact	Comments
Uses the optimal indicator for each purpose		<ol style="list-style-type: none"><li>1. <i>E. coli</i> has an MCL and when confirmed triggers an acute violation.</li><li>2. Total coliform is used as an indicator of distribution system health and does not have an MCL. Confirmed TC+ triggers a system assessment and if the assessment is conducted and acted upon, as required, does not constitute an MCL violation.</li></ol>



# Comparison with FAC Criteria

Criterion	Single-Text Option	Comments
Is supported by scientific data		1. Single-text uses SDWIS-FED and six year review data from total coliform monitoring to inform FAC, and considered outbreak and other health effects information collected since TCR promulgation in 1989.

# Summary of Criteria Comparison

Criterion	Single-Text Impact
Protective of public health	↑
Reduces burden	?
Cost-effective	↑
Simple to implement	?
Considers linkages to other rules	↔
Reflects variations in system types and sizes	↔
Recognizes the value of effective operators	↑
Uses the optimal indicator for each purpose	↑
Is supported by scientific data	↑

# Quantitative Analysis

# What Can be Said About the Accuracy, Reliability, or Utility of the Current Estimates?

- Individual estimates may not represent actual costs as implemented
- General trends in model prediction uncertainty are in the same direction for all options
- Estimates allow relative comparisons, so that questions like the following can be addressed:
  - Which options have higher or lower costs?
  - Which options produce more or fewer events or triggers?

# Assumptions for Analysis

- Used criteria in draft AIP to estimate number of systems doing reduced monitoring
  - All qualified systems are doing the reduced monitoring
- Cost estimates do not include:
  - Costs for demonstrating compliance with reduced monitoring criteria (e.g. site visit)
  - Transaction cost for States to implement the rule
- All numbers presented in tables are based on data from current rule with no assessment or correction
  - Do not reflect impact on future occurrence of shifting to assessment and correction framework
  - Do not reflect impact of implementation of other regulations such as the GWR

# Reduced Monitoring Criteria in Single-Text

- Sanitary survey shows the system to be free of sanitary defects; and
- A clean (TCR) compliance history for a minimum of two compliance periods; and
- Meet at least one of the following criteria:
  - Annual site visit, or
  - Approved Cross Connection Control program, or
  - Certified operator, or
  - Continuous disinfection sufficient to achieve 4-log inactivation of viruses
- To be eligible to have monitoring reduced from quarterly to annual, the system must meet a second of the additional criteria above, one of which must be an annual site visit

# Reduced Monitoring Analysis

- Assumed criteria are independent
- Does not include systems that would qualify based on having a certified operator as we do not have any data on which to base that estimate
- Developed low and high estimate to account for state preferences (data from ASDWA)
  - 27 States currently require monthly monitoring for NCWS
  - 29 States currently require monthly monitoring for CWS
- NCWS annual monitoring estimated using information on state practices (site visits, CCC, disinfection):
  - Lower bound: only MN, MI, and WI currently meet criteria
  - Upper bound: MN, MI, WI, MS, NC, and SC could meet criteria

# Percent of NCWS Qualifying for Reduced Monitoring (GW Only)

		<b>NCWS ≤100</b>	<b>NCWS 101-500</b>	<b>NCWS 501- 1000</b>
	<b>Total Number of Systems</b>	71,285	25,847	3,701
<b>Current Rule/ Single- Text</b>	Percent on monthly	45% 50-59%	50% 58-65%	57% 64-69%
	Percent on quarterly	16% 25-27%	19% 23-24%	18% 22-23%
	Percent on annual	39% 13-25%	30% 11-19%	25% 9-13%

*Note: Range for Single-Text reflects uncertainty in whether States will allow reduced monitoring under revised TCR.*



# Percent of CWS Qualifying for Reduced Monitoring (GW Only)

		<b>CWS ≤100</b>	<b>CWS 101- 500</b>	<b>CWS 501- 1000</b>
	<b>Total Number of Systems</b>	12,058	13,527	4,365
<b>Current Rule/ Single- Text</b>	Percent on monthly	78% 80-86%	83% 81-89%	85% 82-90%
	Percent on quarterly	22% 14-20%	17% 11-19%	15% 10-18%

*Note: Range for Single-Text reflects uncertainty in whether States will allow reduced monitoring under revised TCR.*

# Summary of Single-Text Option (CWS < 1,000)

Option Element	Current Rule	Single-Text
# Systems on Reduced Monit.	6,266	4,103 – 6,589
Routine Monitoring Costs /yr	\$21.2M	\$21.1M - 22.1M
Repeat Monitoring Costs /yr	\$1.0M	\$0.8M
Additional Routine Monit Costs /yr	\$1.3M	0 - \$0.3M
Repeats on Add'l Rout. Monit. Cost /yr	\$0.4M	0 - \$67,000
# Systems Triggered Level 1 *Non-acute	1,895*	1,352 – 1,500
Assessment Costs /yr (Implemented)	0 (\$0.2M)	\$0.3 - 1.1M
PN Costs /yr *Non-acute + Acute	\$0.5M*	\$41,000 - \$43,000
<b>Total Annual Cost</b>	<b>\$24.5M (\$24.7M)</b>	<b>\$22.2M - \$24.5M</b>

# Detailed Breakdown CWS < 1,000

	Option Element	Current Rule	Single-Text
	# Systems	34,602	34,602
	National Cost /yr *	\$24.5M (\$24.7M)	\$22.2M - \$24.5M
Non- Triggered Systems	System Monit. Cost /yr	\$641	\$625 - \$659
	HH Monit. Cost /yr	\$13	\$13 - \$14
Triggered Systems	System Monit. Cost /yr	\$1,552	\$837 - \$990
	HH Monit. Cost /yr	\$33	\$18 - \$21

\* Includes only elements with costs shown in previous table

## Detailed Breakdown Continued CWS <1,000

	Option Element	Current Rule	Single-Text
	# Systems	34,602	34,602
Triggered Systems	System Assess. Cost /yr	(\$100)	\$200 - \$660
	HH Assess. Cost /yr	(\$2)	\$4 - \$14

# Summary of Single-Text Option (NCWS < 1,000)

Option Element	Current Rule	Single-Text
# Systems on Reduced Monit.	54,679	40,370 – 49,207
Routine Monitoring Costs /yr	\$40.0M	\$44.7M - \$50.4M
Repeat Monitoring Costs /yr	\$3.6M	\$3.4M - \$3.9M
Additional Routine Monit Costs /yr	\$5.8M	0 - \$1.6M
Repeats on Add'l Rout. Monit. Cost /yr	\$3.5M	0 - \$0.8M
# Systems Triggered Level 1 *Non-acute	9,537*	7,394 – 9,217
Assessment Costs /yr (Implemented)	0 (\$1.0M)	\$1.3M – \$7.5M
PN Costs /yr *Non-acute + Acute	\$1.1M*	\$86,000 - \$100,000
<b>Total Annual Cost</b>	<b>\$55.0M (\$56.0M)</b>	<b>\$49.6M – \$64.2M</b>

# Detailed Breakdown NCWS < 1,000

	Option Element	Current Rule	Single-Text
	# Systems	103,104	103,104
	National Cost /yr *	\$55.0M (\$56.0M)	\$49.6M – \$64.2M
Non-Triggered Systems	System Monit. Cost /yr	\$392	\$450 - \$507
	System Assess. Cost /yr	0	0
Triggered Systems	System Monit. Cost /yr	\$1,696	\$679 - \$977
	System Assess. Cost /yr	(\$100)	\$180 - \$590

\* Includes only elements with costs shown in previous table

# Summary of Single-Text Option (CWS > 1,000)

Option Element	Current Rule	Single-Text
# Systems on Reduced Monit.	0	0
Routine Monitoring Costs /yr	\$156M	\$156M
Repeat Monitoring Costs /yr	\$2.8M	\$2.8M
Additional Routine Monit Costs /yr	\$0.7M	0
Repeats on Add'l Rout. Monit. Cost /yr	\$92,000	0
# Systems Triggered Level 1 *Non-acute	527*	527
Assessment Costs /yr (Implemented)	0 (\$53,000)	\$0.2M - \$1.0M
PN Costs /yr *Non-Acute + Acute	\$3.3M*	\$78,000
<b>Total Annual Cost</b>	<b>\$162.9M (\$163.0M)</b>	<b>\$159.1M - \$159.9M</b>

# Detailed Breakdown (all CWS > 1,000)

	Option Element	Current Rule	Single - Text
	# Systems	18,777	18,777
	National Cost* /yr	\$162.9M (\$163.0M)	\$159.1M - \$159.9M
Non- Triggered Systems	System Monit. Cost /yr	\$8,000	\$8,000
	HH Monit. Cost /yr	\$1	\$1
Triggered Systems	System Monit. Cost /yr	\$8,000	\$8,000
	HH Monit. Cost /yr	\$2	\$2

\* Includes only elements with costs shown in previous table



## Detailed Breakdown continued (all CWS > 1,000)

	Option Element	Current Rule	Single- Text
	# Systems	18,777	18,777
Triggered Systems	System Assess. Cost /yr	(\$100)	\$290 - \$6,020
	HH Assess. Cost /yr	(\$0.03)	\$0.08 - \$0.34

# Findings

- The national cost for the rule as implemented is similar to the single-text option(s)
- The distribution of costs depends on system size and whether an assessment gets triggered
- For NCWS, the difference in national cost between options is related to the reduced monitoring criteria

# Potential Increase in State Transaction Burden in Single-Text

- Review/documentation required for reduced monitoring
  - Sanitary survey results
  - TCR compliance history
  - CCC program status
  - Annual site visit tracking
  - Operator certification status
  - Disinfection status – 4-log documentation
- Review/assistance for assessment & corrective action
  - Review assessment reports
  - Assist small systems with assessment
  - Consult with systems on appropriate corrective action
  - Review status of corrective action schedules
- Sample plans may need more detailed review
- Training state staff and system operators on new requirements

# Appendix

# Description of System Categories for Assessment of Rule Objectives

Source	Disinfection	CWS / NTNCWS / TNC	Characterizing Dist. System
Surface Water	All systems disinfect to 3-log <i>G. lamblia</i> or greater	All CWS, NTNCWS, and TNC; 83% of surface systems are CWS	Surface water systems tend to serve larger populations and are typically thought of as having an extensive DS.
Ground Water	Disinfected to 4-log virus	Currently infrequent; est. 20% of GW systems post-GWR ( $\geq 2009$ )	Larger systems are more likely to disinfect and more likely to have a DS.
	Secondary residual	EPA estimates 49% CWSs apply a residual; much less frequent in NCWSs	Larger systems are more likely to disinfect and more likely to have a DS.

(continues on next slide)

# Description of System Categories for Assessment of Rule Objectives

Source	Disinfection	CWS / NTNCWS / TNC	Characterizing Dist. System
Ground Water	Undisinfected	Majority of PWS; roughly 80% of NCWSs	Some NCWS and most CWS have multiple connections and resultant external piping.
			Many NCWS and a few CWS have a single service or serve a limited number of structures with limited external piping.

# Summary of Single Text Option (CWS < 1,000)

Option / Element	Current Rule	No Addtl RT High	No Addtl RT Low	W/ Addtl RT High	W/ Addtl RT Low
# Systems on Reduced Monit.	6,266	4,103	6,589	4,103	6,589
Routine Monitoring Costs /yr	\$21.2M	\$22.1M	\$21.1M	\$22.1M	\$21.1M
Repeat Monitoring Costs /yr	\$1.0M	\$0.8M	\$0.8M	\$0.8M	\$0.8M
Additional Routine Monit Costs /yr	\$1.3M	0	0	\$0.3M	\$0.3M
Repeats on Add'l Rout. Monit. Cost /yr	\$0.4M	0	0	\$67,000	\$66,000
# Systems Triggered Level 1	1,895	1,412	1,352	1,500	1,435
Assessment Costs /yr (Implemented)	0 (\$0.2M)	\$0.3-1.0M	\$0.3-1.0M	\$0.3-1.1M	\$0.3-1.1M
PN Costs /yr *Non-acute + Acute	\$0.5M*	\$43,000	\$41,000	\$45,000	\$43,000
<b>Total Annual Cost</b>	<b>\$24.5M (\$24.7M)</b>	<b>\$23.3-24.0M</b>	<b>\$22.2-22.9M</b>	<b>\$23.7-24.5M</b>	<b>\$22.6-23.4M</b>

# Details – Routine Monitoring CWS <1,000

Option Element	Current Rule	No Addtl RT High	No Addtl RT Low	W/ Addtl RT High	W/ Addtl RT Low
# Systems	34,602	34,602	34,602	34,602	34,602
# Systems Monthly	28,337	30,499	28,013	30,499	28,013
# Systems Quarterly	6,266	4,103	6,589	4,103	6,589
# Routine Samples Collected	370,527	386,594	369,447	386,594	369,447
Routine Monitoring Cost /yr	\$21.2M	\$22.1M	\$21.1M	\$22.1M	\$21.1M



## Details – Repeat & Additional Routine Monitoring CWS < 1,000)

Option Element	Current Rule	No Addtl RT High	No Addtl RT Low	W/ Addtl RT High	W/ Addtl RT Low
# Systems	34,602	34,602	34,602	34,602	34,602
# TC+ in Routines	6,577	7,002	6,674	7,003	6,672
Repeat Monitoring Costs /yr	\$1.0M	\$0.8M	\$0.8M	\$0.8M	\$0.8M
Add'l Routine Monit. Costs /yr	\$1.3M	0	0	\$0.3M	\$0.3M
Repeats on Add'l Routine Monit. Costs /yr	\$0.4M	0	0	\$67,000	\$66,000
Total Annual Monitoring Cost	\$24.0M	\$22.9M	\$21.9M	\$23.3M	\$22.3M

## Details – Assessment CWS < 1,000

Option Element	Current Rule	No Addtl RT High	No Addtl RT Low	W/ Addtl RT High	W/ Addtl RT Low
# Systems	34,602	34,602	34,602	34,602	34,602
# Systems with Level 1 Trigger	1,895	1,412	1,352	1,500	1,435
Level 1 Cost /yr (Impl.)	0 (\$0.2-1.2M)	\$0.3-1.0M	\$0.3-1.0M	\$0.3-1.1M	\$0.3-1.1M
# Systems with Acute Violations	195	148	141	157	150
Public Notif. Cost for Non- acute /yr	\$0.4M	0	0	0	0
Public Notif. Cost for Acute /yr	\$56,000	\$43,000	\$41,000	\$45,000	\$43,000

# Detailed Breakdown CWS < 1,000

\* Includes only elements with costs shown

	Option Element	Current Rule	No Addtl RT High	No Addtl RT Low	W/ Addtl RT High	W/ Addtl RT Low
	# Systems	34,602	34,602	34,602	34,602	34,602
	National Cost /yr *	\$24.5M (\$24.7M)	\$23.3- 24.0M	\$22.2- 22.9M	\$23.7- 24.5M	\$22.6- 23.4M
Non- Triggered Systems	System Monit. Cost /yr	\$641	\$654	\$625	\$659	\$630
	HH Monit. Cost /yr	\$13	\$14	\$13	\$14	\$13
Triggered Systems	System Monit. Cost /yr	\$1,552	\$869	\$837	\$990	\$964
	HH Monit. Cost /yr	\$33	\$18	\$18	\$21	\$21

## Detailed Breakdown Continued CWS <1,000

	Option Element	Current Rule	No Addtl RT High	No Addtl RT Low	W/ Addtl RT High	W/ Addtl RT Low
	# Systems	34,602	34,602	34,602	34,602	34,602
Triggered Systems	System Assess. Cost /yr	(\$100)	\$200 - \$660	\$200 - \$660	\$200 - \$660	\$200 - \$660
	HH Assess. Cost /yr	(\$2)	\$4-14	\$4-14	\$4-14	\$4-14

# Summary of Single Text Option (NCWS < 1,000)

Option / Element	Current Rule	No Addtl RT High	No Addtl RT Low	W/ Addtl RT High	W/ Addtl RT Low
# Systems on Reduced Monit.	54,679	40,370	49,207	40,370	49,207
Routine Monitoring Costs /yr	\$40.0M	\$50.4M	\$44.7M	\$50.4M	\$44.7M
Repeat Monitoring Costs /yr	\$3.6M	\$3.9M	\$3.4M	\$3.7M	\$3.3M
Additional Routine Monit Costs /yr	\$5.8M	0	0	\$1.6M	\$1.5M
Repeats on Add'l Rout. Monit. Cost /yr	\$3.5M	0	0	\$0.8M	\$0.7M
# Systems Triggered Level 1	9,537	8,264	7,394	9,217	8,266
Assessment Costs /yr (Implemented)	0 (\$1.0M)	\$1.5-6.3M	\$1.3-5.5M	\$1.7-7.5M	\$1.5-6.7M
PN Costs /yr *Non-acute + Acute	\$1.1M*	\$97,000	\$86,000	\$0.1M	\$95,000
<b>Total Annual Cost</b>	<b>\$55.0M (\$56.0M)</b>	<b>\$55.9-60.6M</b>	<b>\$49.6-53.8M</b>	<b>\$58.4-64.2M</b>	<b>\$51.9-57.1M</b>

## Details – Routine Monitoring NCWS <1,000

Option Element	Current Rule	No Addtl RT High	No Addtl RT Low	W/ Addtl RT High	W/ Addtl RT Low
# Systems	103,104	103,104	103,104	103,104	103,104
# Systems Monthly	48,425	62,734	53,897	62,734	53,897
# Systems Quarterly	17,174	26,694	25,359	26,694	25,359
# Systems Annually	37,505	12,950	23,847	12,950	23,847
# Routine Samples Collected	699,150	881,361	782,014	881,361	782,014
Routine Monitoring Cost /yr	\$40.0M	\$50.4M	\$44.7M	\$50.4M	\$44.7M

## Details – Repeat & Additional Routine Monitoring NCWS < 1,000)

Option Element	Current Rule	No Addtl RT High	No Addtl RT Low	W/ Addtl RT High	W/ Addtl RT Low
# Systems	103,104	103,104	103,104	103,104	103,104
# TC+ in Routines	22,980	32,600	28,830	31,597	27,993
Repeat Monitoring Costs /yr	\$3.6M	\$3.9M	\$3.4M	\$3.7M	\$3.3M
Add'l Routine Monit. Costs /yr	\$5.8M	0	0	\$1.6M	\$1.5M
Repeats on Add'l Routine Monit. Costs /yr	\$3.5M	0	0	\$0.8M	\$0.7M
Total Annual Monitoring Cost	\$53.0M	\$54.3	\$48.1	\$56.6	\$50.3

## Details – Assessment NCWS < 1,000

Option Element	Current Rule	No Addtl RT High	No Addtl RT Low	W/ Addtl RT High	W/ Addtl RT Low
# Systems	103,104	103,104	103,104	103,104	103,104
# Systems with Level 1 Trigger	9,537	8,264	7,394	9,217	8,266
Level 1 Cost /yr (Impl.)	0 (\$0.9M)	\$1.5-6.3M	\$1.3-5.5M	\$1.7-7.5M	\$1.5-6.7M
# Systems with Acute Violations	1,133	969	862	1,058	948
Public Notif. Cost for Non- acute /yr	\$0.1M	0	0	0	0
Public Notif. Cost for Acute /yr	\$0.1M	\$97,000	\$86,000	\$0.1M	\$95,000



# Detailed Breakdown NCWS < 1,000

\* Includes only elements with costs shown

	Option Element	Current Rule	No Addtl RT High	No Addtl RT Low	W/ Addtl RT High	W/ Addtl RT Low
	# Systems	103,104	103,104	103,104	103,104	103,104
	National Cost /yr *	\$55.0M (\$56.0M)	\$55.9- 60.6M	\$49.6- 53.8M	\$58.4- 64.2M	\$51.9- 57.1M
Non- Triggered Systems	System Monit. Cost /yr	\$392	\$507	\$450	\$506	\$449
	System Assess. Cost /yr	0	0	0	0	0
Triggered Systems	System Monit. Cost /yr	\$1,696	\$744	\$679	\$977	\$921
	System Assess. Cost /yr	(\$100)	\$180 - \$590	\$180 - \$590	\$180 - \$590	\$180 - \$590

# Summary of Single Text Option (CWS > 1,000)

Option Element	Current Rule	Single Text Option
# Systems on Reduced Monit.	0	0
Routine Monitoring Costs /yr	\$156M	\$156M
Repeat Monitoring Costs /yr	\$2.8M	\$2.8M
Additional Routine Monit Costs /yr	\$0.7M	0
Repeats on Add'l Rout. Monit. Cost /yr	\$92,000	0
# Systems Triggered Level 1	0 (527)	527
Assessment Costs /yr (Implemented)	0 (\$53,000)	\$0.2M - \$1.0M
PN Costs /yr *Non-Acute + Acute	\$3.3M*	\$78,000
<b>Total Annual Cost</b>	<b>\$162.9M (\$163.0M)</b>	<b>\$159.1M - \$159.9M</b>

## Details – Routine Monitoring (all CWS > 1,000)

Option / Element	Current Rule	Single Text Option
# Systems	18,777	18,777
# Routine Samples Collected	2,626,509	2,626,509
Routine Monitoring Cost /yr	\$156M	\$156M

## Details – Repeat & Additional Routine Monitoring (all CWS > 1,000)

Option Element	Current Rule	Single Text Option
# Systems	18,777	18,777
# TC+ in Routines	14,428	14,428
Repeat Monitoring Costs /yr	\$2.8M	\$2.8M
Add'l Routine Monit. Costs /yr	\$0.7M	0
Repeats on Add'l Routine Monit. Costs /yr	\$92,000	0
Total Monitoring Cost /yr	\$159M	\$158M

## Details – Assessment (all CWS > 1,000)

Option Element	Current Rule	Single Text Option
# Systems	18,777	18,777
# Systems with Level 1 Trigger*	0 (527)	527
Level 1 Cost* /yr (Impl.)	0 (\$53,000)	\$0.2M - \$1.0M
# Systems with Acute Violations	97	97
Public Notif. Cost for Non-Acute /yr	\$3.2M	0
Public Notif. Cost for Acute /yr	\$78,000	\$78,000

\* Represents an upper bound

# Detailed Breakdown (all CWS > 1,000)

\* Includes only elements with costs shown

	Option Element	Current Rule	Single Text Option
	# Systems	18,777	18,777
	National Cost* /yr	\$162.9M (\$163.0M)	\$159.1M - \$159.9M
Non- Triggered Systems	System Monit. Cost /yr	\$8,000	\$8,000
	HH Monit. Cost /yr	\$1	\$1
Triggered Systems	System Monit. Cost /yr	\$8,000	\$8,000
	HH Monit. Cost /yr	\$2	\$2

## Detailed Breakdown continued (all CWS > 1,000)

	Option Element	Current Rule	Single Text Option
	# Systems	18,777	18,777
Triggered Systems	System Assess. Cost /yr	(\$100)	\$290 - \$6,020
	HH Assess. Cost /yr	(\$0.03)	\$0.08 - \$0.34